REMARKS

Reconsideration of the present application is respectfully requested in view of the following remarks. Prior to entry of this response, claims 1-5 were pending in the application, of which claims 1 and 3 are independent. In the Office Action dated May 6, 2005, claims 1-5 were rejected under 35 U.S.C. § 103(a). In this response, Applicant adds new independent claim 6. Following this response, claims 1-6 remain pending in this application. Applicant hereby addresses the Examiner's rejections.

I. Amendments to the Claims

Claims 1, 3, 4 and 5 have been amended to correct informalities and to more clearly recite the claimed invention. These amendments are not made to distinguish the claims over the prior art, and Applicant respectfully asserts that the scope of the respective claims has not been changed.

II. Rejection of the Claims Under 35 U.S.C. § 103(a)

The Examiner rejected claims 1-5 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,306,921 to Tanaka, *et al.* ("Tanaka") in view of U.S. Patent Application Serial No. 10/196,160 by Peck, *et al.* ("Peck"). To establish a *prima facie* case of obviousness, the prior art combination must teach or suggest all of the claim limitations of each rejected claim. MPEP 2142. Because the cited combination does not teach or suggest every limitation of independent claims 1 and 3, the Examiner has not established a *prima facie* case of obviousness with regard to any of claims 1-5.

Amended claim 1 recites a method of predicting a lifetime of a filament comprising, among other things, "predicting the time until the filament will be broken, on

the basis of a rate of change of the resistance value." The Examiner states that Peck discloses predicting a lifetime of a filament on the basis of a rate of change of the resistance value computed by the resistance operation device. (5-6-05 OA, p. 3). Applicant respectfully asserts that Peck does not disclose the above-referenced limitation of amended claim 1.

The Examiner points to paragraphs [0040-0042] of Peck as disclosing predicting filament lifetime on the basis of rate of change of the resistance value. However, Peck discloses measuring the ratio of filament resistance at hot temperatures to filament resistance at cold temperatures (the "resistance ratio") at discrete time intervals throughout the life of the filament in order to determine, using the known nearly linear response of the resistance ratio, whether the filament has reached a predetermined threshold point at which it should be replaced. (Peck, p. 4, ¶ 41, 42). While Peck does disclose measuring the resistance values R_H and R_C at discrete time intervals in order to account for unreliable data points (Id. at ¶¶ 39, 41), Peck does not teach measuring the rate of change of resistance (i.e. dr/dt) to predict the time until the filament will be broken.

By measuring the rate of change of resistance, as recited in Applicant's claim 1, the time until the filament will be broken may be determined. Because Peck does not disclose measuring the rate of change of resistance to determine the time until the filament will be broken, but instead teaches occasionally measuring the resistance ratio to determine whether it has reached some threshold level at which the filament should be replaced, it does not teach the above-referenced limitation of amended claim 1. Accordingly, the cited combination does not teach every limitation of claim 1, and

Applicant respectfully requests that the rejection be withdrawn. Because claim 2 depends from claim 1, and therefore includes each of its limitations, Applicant requests that the rejection of claim 2 be withdrawn as well.

The Examiner also rejected claim 3 over Tanaka in view of Peck. Amended claim 3 recites, among other things, "a prediction operation device for computing a time at which an application limit of the filament will be reached or a time left till the application limit of the filament is reached, on the basis of a rate of change of the resistance value computed by the resistance operation device." The Examiner cites Peck as disclosing this limitation.

However, Peck does not teach the above-quoted limitation of claim 3, but instead teaches measuring the resistance ratio of the filament at various times over the life of the filament to determine whether a predetermined threshold of the resistance ratio has been reached. Peck does not teach measuring the rate of change of the resistance value in order to determine the time at which the application limit of the filament will be reached or the time left till the application limit of the filament is reached. Accordingly, the cited combination does not teach each limitation of claim 3, and Applicant respectfully requests that the rejection be withdrawn. Because claims 4-5 depend from claim 3, and therefore include each of its limitations, Applicant requests that the rejection of claims 4-5 be withdrawn as well.

The Examiner rejected dependent claim 4 over Tanaka in view of Peck, stating that Peck discloses the limitation contained therein, pointing to Fig. 5 and page 8, ¶ 67 of Peck. Applicant respectfully asserts that the display device disclosed by Peck is not operative to display the time at which the application limit of the filament is reached or

the time left until the application limit of the filament is reached. Instead, Peck discloses that the "status display panel 508 shown in Fig. 5 may be used to display any of the alarm conditions associated with the resistance values of the resistance ratio values discussed in connection with FIGS. 8A, 8B, and 8C." The Examiner has failed to point out, and Applicant is unaware of, any content of Peck disclosing that the term "alarm condition" includes the time at which the application limit of the filament is reached or the time left until the application limit of the filament is reached. Accordingly, because the Examiner has not pointed to any structure of the cited combination disclosing each limitation of claim 4, a *prima facie* case of obviousness has not been established and the rejection is improper.

Moreover, not only does the cited combination fail to teach or suggest each limitation of the pending claims, but Peck actually teaches away from the claimed invention. In relying on a prior art reference, the Examiner must consider the reference "in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." MPEP 2143.02 (emphasis in original). The invention recited in independent claim 1 enables predicting a lifetime of a filament based on the rate of change of the resistance encountered in the filament during operation of an ion source. Similarly, independent claim 3 recites, among other things, a system capable of calculating a single resistance value by measuring the voltage across the filament and the current flowing through the filament. Thus, in each of the rejected independent claims, the prediction is made based on the measurement of a single resistance value.

In contrast, Peck actually requires successively measuring two resistance values in order to predict filament lifetime: (i) resistance of the filament core at hot

temperatures (R_H) and (ii) resistance of the filament core at cold temperatures (R_C). In light of this teaching, one of ordinary skill would have not have been motivated to measure the rate of change of only a single resistance value (e.g., the resistance value encountered during operation of the ion source) in order to predict filament lifetime. MPEP 2143.01. Further, Peck actually affirmatively teaches away from successively measuring only a single resistance value: ". . . prior techniques, which measured single resistance values . . . would produce unreliable results that could not be used for predicting ultimate failure of a heating element." (Peck, ¶ 42, emphasis added). Accordingly, as Peck teaches away from predicting filament lifetime based on successive measurements of a single resistance value, a skilled artisan would have had no reasonable expectation of success in combining the cited references to achieve the claimed invention. Therefore, the rejection of claims 1-5 over the combination of Peck and Tanaka is improper, and should be withdrawn.

III. New Claim

Applicant has added new claim 6 reciting, among other things, "a display device for displaying the time at which the application limit of the filament is reached or the time left until the application limit of the filament is reached."

As described above, the Examiner has pointed to nothing in the cited combination teaching or disclosing this limitation of claim 6. For this reason, as well as the reasons discussed above with regard to claim 1, Applicant respectfully asserts that claim 6 is in condition for allowance.

IV. Conclusion

In view of the foregoing remarks and amendments, Applicant respectfully requests the reconsideration and reexamination of this application and the timely allowance of the pending claims. The preceding arguments are based only on the arguments in the Office Action, and therefore do not address patentable aspects of the invention that were not addressed by the Examiner in the Office Action. The claims may include other elements that are not shown, taught, or suggested by the cited art. Accordingly, the preceding argument in favor of patentability is advanced without prejudice to other bases of patentability.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Dated: October 3, 2005

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